

APPLICATION
FOR
UNITED STATES LETTERS PATENT
ENTITLED

METHODS AND SYSTEMS TO LINK AND MODIFY DATA

TO WHOM IT MAY CONCERN:

BE IT KNOWN THAT (1) AARON A. GOODISMAN and (2) SANDRA E. SERKES of (1) 40 Marion Road, Watertown, MA 02472 and (2) 40 Marion Road, Watertown, MA 02472, invented certain new and useful improvements entitled as set forth above of which the following is a specification:

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3 METHODS AND SYSTEMS TO LINK AND MODIFY DATA

4
5 CLAIM OF PRIORITY

6 This application claims priority to U.S.S.N. 60/249,498,
7 entitled "Methods And Systems Integrating Wireless Web/Internet
8 And Java-Based Application Servers", and filed on November 17,
9 2000, naming Sandra E. Serkes and Aaron A. Goodisman as
10 inventors, the contents of which are herein incorporated by
11 reference in their entirety, and this application is a
12 continuation-in-part of U.S.S.N 09/970,202, entitled "Methods and
13 Systems to Link Data," filed on October 3, 2001, naming Aaron A.
14 Goodisman and Sandra E. Serkes as inventors, the contents of
15 which are also herein incorporated by reference in their
16 entirety.

17
18 BACKGROUND

19 (1) Field

20 The disclosed methods and systems relate generally to
21 increasing availability of information on a network, and more
22 particularly to generating links to enhance network connectivity
23 between data and related information and services.

24 (2) Description of Relevant Art

1 An increased amount of information is available to those who
2 can access the internet. The available information can include
3 personal information such as bank accounts, addresses, phone
4 numbers, and email addresses, and consumer information that
5 includes web sites having products for sale or auction. The term
6 P2P or peer-to-peer describes the sharing of information between
7 individuals, while the term B2B or business-to-business,
8 describes transactions between businesses. Furthermore, general
9 information is available, including research articles, term
10 papers, course work, and presentations. In some instances, these
11 resources can be obtained within an intranet that can serve an
12 individual business, organization, company, etc.

13 As the popularity of the internet grows, there is an
14 increased popularity in electronic devices. This increased
15 popularity can be driving a trend towards miniaturization of
16 electronic devices to allow portability and accessibility at
17 remote locations. Accordingly, many otherwise traditional and
18 modular electronic devices, including cellular phones, are
19 becoming web-enabled using the wireless web and associated
20 wireless protocols, to allow access to internet information and
21 services from virtually any location.

22 In part because some of the miniature devices have
23 traditionally smaller displays, in part because there are
24 increased numbers of users seeking increased functionality from

1 their electronic devices, and in part because there are an
2 increased number of information providers, there is a need to
3 integrate information and resources available on a network such
4 as the internet.

6 SUMMARY

7 The disclosed methods and systems provide associations or
8 links from an object in a document to at least one other object
9 based on context data. Context data can include data regarding a
10 user's device, environment (e.g., time of day, location),
11 actions, user profile, security clearance, job function and/or
12 description, the document type, the document location, an
13 application executing on the device, and the user's identity,
14 although such examples are provided for illustration and not
15 limitation, and context information, context data, and context
16 filtering can be understood herein to include information or
17 data, or the processing thereof, of data particular to the
18 device, the device user, and/or the object to be linked. Link
19 activation can cause a retrieval of data associated with at least
20 one of the linked objects, and additionally and optionally,
21 commencement of a process. Objects can include a document or
22 portion thereof, including words, sentences, groups of words,
23 numbers, or any other part of the document. Objects can also
24 include database records, icons, figures, images, trademarks,

1 pictures, and other non-textual content. Links between objects
2 can include links that utilize hypertext protocols, but other
3 protocols (e.g., secure Hypertext Transfer protocol (HTTPS),
4 wireless telephony application interface (WTAI), file transfer
5 protocol (FTP), file protocol (e.g., local files), news protocol
6 (e.g., news groups or articles), gopher, mailto, telnet) can be
7 used without departing from the scope of the disclosed methods
8 and systems.

9 Link activation can be caused by a variety of techniques
10 that include specifying, designating, or otherwise selecting a
11 link. Link activation can cause a retrieval and/or presentation
12 of information or data, where the data or information is
13 associated with the linked objects. Additionally and optionally,
14 link activation can activate a process such as an applet, a
15 program, a script, computer instructions, or another process
16 including a telephone call.

17 Linked objects can reside within resources such as
18 databases, documents, and other storage media that can be
19 internally or externally located to an organization, business, or
20 other entity. In some embodiments, the linked objects can be
21 accessed through a network including an intranet. Additionally
22 and optionally, objects can be linked to objects that can be
23 accessed via a network such as the internet.

1 A linkify engine that can include instructions that can be
2 executed by a processor, can dynamically generate or otherwise
3 provide the links between the objects. The linkify engine can
4 retrieve data or other information from data sources or network
5 accessible devices through the internet, intranet, or combination
6 thereof, at fixed or otherwise determined intervals. The
7 information or data can also be updated at given intervals, where
8 the control of such updating can be performed by the linkify
9 engine or, for example, a microprocessor or process associated
10 with the network accessible devices or data sources from which
11 the data is obtained or retrieved.

12 The linkify engine can generate links by parsing a document
13 into blocks based in part on the document type, utilize context
14 information to determine potential links from the blocks, utilize
15 a pattern matcher to establish relationships between the blocks,
16 and provide one or more outputs that can include the document and
17 associated links. In some embodiments, the document and links
18 can be in one linkified document, while in other embodiments, the
19 document can be associated with another program and/or another
20 document(s) that can, in combination, provide the links.

21 The linkify engine can include memory components and/or
22 devices, including databases, to maintain data from internal
23 and/or external data sources from which associations can be

1 derived. The linkify engine can also use one or more
2 configuration files to further define or specify link parameters.

3 Other objects and advantages will become apparent
4 hereinafter in view of the specification and drawings.

5 6 BRIEF DESCRIPTION OF THE DRAWINGS

7 FIG. 1 is a block diagram of one linkify engine having one
8 input and output;

9 FIG. 2 is a block diagram showing links generated by the
10 linkify engine;

11 FIG. 3 is an architectural block diagram providing sample
12 communicative links for a linkify engine;

13 FIG. 4 presents a block diagram of sample features of a
14 linkify engine;

15 FIG. 5 presents a more detailed block diagram of sample
16 features for a linkify engine; and,

17 FIG. 6 illustrates a sample linkify output for an email
18 document.

19 20 DESCRIPTION

21 To provide an overall understanding, certain illustrative
22 embodiments will now be described; however, it will be understood
23 by one of ordinary skill in the art that the systems and methods
24 described herein can be adapted and modified to provide systems

1 and methods for other suitable applications and that other
2 additions and modifications can be made without departing from
3 the scope of the systems and methods described herein.

4 Unless otherwise specified, the illustrated embodiments can
5 be understood as providing exemplary features of varying detail
6 of certain embodiments, and therefore features, components,
7 modules, and or aspects of the illustrations can be otherwise
8 combined, separated, interchanged, and/or rearranged without
9 departing from the disclosed systems or methods.

10 The methods and systems disclosed herein can be described
11 relative to a network such as the internet, although the methods
12 and systems can be applied to any network, wired or wireless,
13 that can use a variety of communications protocols. Accordingly,
14 it can be understood that references herein to the internet
15 include references to any network.

16 The disclosed methods and systems can dynamically associate,
17 for example, link objects in a document, to objects that can be
18 accessed on or by network accessible devices, including other
19 objects in the document. Objects can be a document or portion
20 thereof, including words, sentences, groups of words, numbers, or
21 any other part of the document. Objects can also include
22 database records, icons, figures, images, trademarks, pictures,
23 and other non-textual content included in a document. The
24 document can be of varying formats, including ascii, pdf, binary,

1 text, combinations thereof, or other types, with the document
2 types provided explicitly as merely exemplary.

3 The links can be formed based on context data. Context data
4 can include data regarding a user's device, environment (e.g.,
5 time of day, location), actions, user profile, security
6 clearance, job function and/or description, the document type,
7 the document location, an application executing on the device,
8 and the user's identity, although such examples are provided for
9 illustration and not limitation, and context information, context
10 data, and context filtering can be understood herein to include
11 information or data, or the processing thereof, of data
12 particular to the device, the device user, and/or the object to
13 be linked. Accordingly, those with ordinary skill in the art
14 will recognize that, based on context filtering, the same
15 information or data, or links thereto, can be presented to two
16 different users in two different manners, or additionally and
17 optionally, only presented to one of such users.

18 Links between objects can include links that utilize
19 hypertext protocols, but other protocols (e.g, secure Hypertext
20 Transfer protocol (HTTPs), wireless telephony application
21 interface (WTAI), file transfer protocol (FTP), file protocol
22 (e.g., local files), news protocol (e.g., news groups or
23 articles), gopher, mailto, telnet) can be used without departing
24 from the scope of the disclosed methods and systems.

1 Additionally, the network upon which the objects can be linked
2 can include one or more microprocessor-based systems that can be
3 in communications with one or more storage and/or peripheral
4 devices.

5 The methods and systems can also be applied to associating
6 or linking data from an image (e.g. logo, picture, photograph,
7 etc.), text-oriented audio content derived from Interactive Voice
8 Response (IVR) systems, voice mail, telephone conversation or
9 other audio data, audio-only access to the internet, and email
10 readers. Accordingly, for the purposes of the discussion herein,
11 references to documents or networked documents can include
12 documents as previously provided herein, and also images and
13 text-oriented audio content.

14 The networked documents can be viewed on or otherwise
15 accessed by a device that can be referenced herein as an
16 initiating device. In some embodiments, the associations that
17 can link the documents to the devices can be hypertext links, for
18 example. The links can be incorporated into and/or integrated
19 with the networked documents for viewing, display, or other
20 presentation (e.g., audible) on the initiating device. In an
21 example where the links are hypertext links incorporated into a
22 HTML document, the hypertext links can be associated with or
23 otherwise provide direction to database information, web pages,
24 other networked documents, and/or a device that can be accessed

1 through the network. Examples of accessible devices can include
2 cellular telephones, landline telephones, printers, servers,
3 storage mechanisms, and computer peripheral devices, although
4 such example devices are provided merely for illustration and not
5 limitation. Activating a link can provide a communicative
6 connection between the initiating device and the network
7 accessible device, and the link activation may additionally and
8 optionally cause information or other data to be communicated to
9 what can herein be referred to as a target. For example, if the
10 link is a hyperlink in a web page, and connects to another web
11 page on a different server, the target can be a browser on the
12 initiating device (e.g., activating the link can cause the linked
13 page to be transferred to a browser page for display on the
14 initiating device). In another example, activation of a link,
15 where the initiating device can be a cellular phone, can cause a
16 telephone connection between the initiating device and, for
17 example, another telephone. In some embodiments, the target can
18 be a document that includes a linked object; for example, link
19 activation can cause text in one document to be replaced, be
20 augmented with adjacent text, or be appended with information
21 (e.g., abstract) or other data in a footnote or other
22 presentation. In some embodiments, linked objects can reside on
23 the same device, and additionally and optionally, a link can be
24 between two objects in the same document.

1 Referring to FIG. 1, there is a block diagram of a general
2 process and system for providing links 100. A document 102 can
3 be presented to a linkify engine 104 that includes processor-
4 executable instructions. The linkify engine 104 can identify
5 items within the document and generate links, to generate a
6 linkified document 14. As will be disclosed herein, the
7 generated links can be integrated in the linkified document 14
8 such that the linkified document maintains a general format to
9 the document 102, while in other embodiments, the links can be
10 included in a separate database or document that can be
11 associated with the document 102.

12 Referring now to FIG. 2, there is a illustrative system 10
13 that includes an initiating device 12 with a display for
14 presenting the linkified document 14. The illustrated linkified
15 document 14, as a result of the methods and systems disclosed
16 herein and provided in the linkify engine 104, includes several
17 links 16a-16c to objects that can be located on network
18 accessible devices 18a-18e, of which only five such devices are
19 illustrated. The methods and systems are not limited to the
20 number or type of network accessible devices 18a-18e.
21 Accordingly, the FIG. 2 illustrated links 16a-16c can, when
22 activated, provide one or more associations, connections, and/or
23 links between the initiating device 12 and one or more of the
24 objects on the illustrated network accessible devices 18a-18e.

1 As will be provided herein, link activation can additionally and
2 optionally initiate one or more activities, processes, or
3 applications between the one or more linked or associated
4 devices. For example, activation of a link related to a
5 telephone number can cause a user's designated telephone to
6 connect to a telephone associated with the link via a script or
7 other application that is associated with the link. Similarly,
8 link activation can cause a server to send a document or other
9 file to a printer, storage device, email or other network server,
10 etc. In some embodiments, the secondary devices (e.g., printer
11 in the previous example) may not be otherwise accessible to the
12 user of the initiating device.

13 For the purposes of the disclosed systems and methods, an
14 initiating device 12 can include a digital computer system that
15 can utilize a wired or wireless communications link to connect to
16 a communication network such as the internet. A user of the
17 initiating device 12 can utilize different peripheral devices
18 that can be integrated with or otherwise configured for
19 compatibility with the initiating device 12. For example, the
20 initiating device 12 can include a keyboard, keypad, stylus,
21 digital camera, microphone, etc., that can communicate data to
22 the initiating device using wired or wireless communications
23 systems and/or protocols, etc. The initiating device 12 can be a
24 microprocessor-based system including a computer workstation,

1 such as a PC workstation or a SUN workstation, handheld, palmtop,
2 laptop, personal digital assistant (PDA), cellular phone, etc.,
3 that includes a program for organizing and controlling the
4 initiating device 12 to operate as described herein.
5 Additionally and optionally, the initiating device 12 can be
6 equipped with a sound and video card for processing multimedia
7 data. The initiating device 12 can operate as a stand-alone
8 system or as part of a networked computer system. Alternatively,
9 the initiating device 12 can be a dedicated device, such as an
10 embedded system, that can be incorporated into existing hardware
11 devices, such as telephone systems, PBX systems, sound cards,
12 etc. Accordingly, it will be understood by one of ordinary skill
13 in the art that the initiating device 12 described herein has
14 wide applicability and can be incorporated in many systems, and
15 realized in many forms.

16 For a system according to FIG. 2, the initiating device 12
17 can be connected to a network such as the internet and can be
18 equipped with what is well-known as an internet "browser" such as
19 the commercially available Netscape Navigator, Internet Explorer,
20 etc., browsers, and those with ordinary skill in the art will
21 recognize that, depending upon the initiating device 12 and its
22 configuration, the browser can differ, and hence references
23 herein to a browser can include references to a user interface to
24 the internet or other network, wherein the methods and systems

1 herein are not limited to the browser or other network interface.

2 Furthermore, the initiating device 12 can access the internet
3 using wired or wireless communications links and/or protocols.

4 The illustrated linkified document 14, and additionally, the
5 document 102 of FIG. 1 from which the linkified document 14 is
6 formed, can include one or more document formats, for example,
7 HTML (Hypertext Markup language), WML (Wireless Markup Language),
8 HDML (Handheld Device Markup Language), XML (Extensible Markup
9 Language), PDF (Portable Document Format), Microsoft Word,
10 VoiceXML (Voice Mark-up Language), and RFC822 (Request for
11 Comments #822, standard internet email format) documents,
12 although such examples are provided for illustration and not
13 limitation.

14 For the illustrated methods and systems, and as previously
15 described herein, a link 16a-16c can be understood as a
16 connection or association between a document or portion thereof,
17 including a word(s), icon, image, picture, portion thereof, or
18 another object, to another document or portion thereof, including
19 a word(s), icon, image, picture, portion thereof, document
20 record, application, or another object as previously defined
21 herein. The links can use a protocol such as HTTP, secure
22 Hypertext Transfer protocol (HTTPs), wireless telephony
23 application interface (WTAI), file transfer protocol (FTP), file
24 protocol (e.g., local files), news protocol (e.g., news groups or

1 articles), gopher, mailto, telnet, etc., and such examples are
2 provided for illustration and not limitation.

3 In some embodiments, the links can be selectable by a user,
4 while in other embodiments, the links can be activated
5 automatically upon link generation.

6 The objects connected by the links 16a-16c can be on
7 separate servers or devices, or the same server or device. The
8 objects can be designed to include sound and/or video. A link
9 16a-16c can include, for example, a hyperlink that can be a
10 highlighted or underlined word or picture that can be activated
11 and/or selected by a user with a mouse, keyboard, stylus, voice
12 (microphone) or other peripheral device. As indicated herein,
13 the links 16a-16c can be incorporated into the document 102 while
14 maintaining the format of the document 102. In some embodiments,
15 the linkified document 14 and the document 102 can be identical
16 formats, while in some embodiments, the formats of the two
17 documents can differ.

18 In some embodiments, links can be presented in a "link
19 summary" format that can include a separate section presenting
20 links for the document. The link summary can be appended to the
21 end of a linkified document or page 14, provided as a footnote,
22 associated with the linkified document via a hypertext or other
23 link, etc. In an embodiment, the links can be formed for
24 compatibility with a browser plug-in or other application, and in

1 such embodiments, the linkified document 14 may not include
2 visible indications of the links absent the accompanying plug-in
3 or application. Such links can thus be referred to as encoded
4 links. For example, in one embodiment, the linkify engine 104
5 can represent or otherwise provide links for compatibility with a
6 text editor to allow the links to appear as a visual overlay to
7 the document 102, such that the "linkified" document 104 may not
8 be modified from the document 102. Accordingly, references to
9 the linkified document 102 can be understood to include one or
10 more objects (e.g., document and associated applet compatible
11 with a plug-in) as provided herein, where the one or more objects
12 can be associated to provide links as also provided herein.

13 The FIG. 2 links 16a-16c can be activated by selecting the
14 link with a mouse, stylus, keypad, keyboard entry, voice
15 activation, or other form of selection, where the methods and
16 systems herein are not limited by the mode of link selection or
17 activation. Link activation can cause data to be retrieved from
18 either or both of the linked objects or other data associated
19 with the linked objects, and the retrieved data can be provided
20 to a target.

21 Targets can be understood to be a destination for data that
22 can be retrieved or otherwise provided via a link selection or
23 activation. Targets can be, for example, an object (e.g.,
24 document or portion thereof) as defined herein, or targets can

1 include devices, applications, scripts, etc. In one example
2 where a target is an object, a portion of a document can include
3 a link, and when the link is activated, the object (e.g., text)
4 can be replaced with other text, appended to, and/or a footnote
5 created in the document. In an embodiment, a target can be a
6 pop-up window that provides data or information regarding one or
7 more of the linked objects (e.g., personal contact information,
8 status of a telephone connection caused by the link activation,
9 etc.). Targets can also include a telephone connection, a new
10 browser window, a presentation of text that can be incorporated
11 as an aside within a document, another document or window, or the
12 present document or window (e.g., replace contents of present web
13 page with linked web page, etc.). Those with ordinary skill in
14 the art will recognize that there are various forms of targets,
15 and the methods and systems herein are not limited to the type or
16 format of targets.

17 In some applications and embodiments, multiple targets can
18 be used, and multiple targets can be associated with a single
19 link. The multiple targets can be related or unrelated. In one
20 example of multiple targets, for a document 104 with a telephone
21 number that can be identified and transformed to a link in the
22 linkified document 14, such link activation can cause targets
23 including a telephone connection and a pop-up window providing
24 status on the telephone connection. Additionally and optionally,

1 a pop-up window could be presented with the address or other
2 information about the person or entity being called.

3 In some embodiments, a user can be provided with a list of
4 possible targets, and the user can select one or more of the
5 possible targets. The target list can be provided with a
6 graphical user interface, for example, that can be presented on
7 the initiating device 12. The target selections can be presented
8 using radio buttons, check-boxes, drop-down selections, voice-
9 activated presentations and selections, or other selectable
10 options compatible with the methods and systems provided herein,
11 with such examples provided for illustration and not limitation.

12 In summary, objects can be associated via links. Link
13 activation can cause information or other data to be retrieved
14 from either or both of the objects, optionally processed, and
15 optionally presented or otherwise provided to one or more
16 targets.

17 Referring now to FIG. 3, there is an example architectural
18 block diagram 20 illustrating the different communicative aspects
19 of a linkify engine 104. The linkify engine 104 can be a
20 software module or set of software modules that can be
21 implemented in one or more higher level languages and/or assembly
22 code. For the illustrated systems, the linkify engine 104 can be
23 a software module or set of software modules that can utilize a
24 Java or J2EE platform to provide platform independence.

1 For illustrative purposes, the FIG. 3 system 20 can be
2 discussed with respect to a supplier of goods and services. The
3 linkify engine 104 can receive data from supplier-internal
4 sources 22 that can include databases related to inventory,
5 shipping information 24, other customer data, other supplier
6 data, Customer Relationship Management (CRM) data 26, business
7 goals data, etc. Data from external sources 28 can also
8 contribute to the linkify engine and can include data from a
9 market research provider 30, archive data from an external source
10 32, and data from a video host server 34 or a presentation ASP
11 36. Those with ordinary skill in the art will recognize that the
12 example system of FIG. 3 is provided for illustration and not
13 limitation, and the methods and systems disclosed herein are not
14 limited to the internal 22 and/or external 28 sources. In some
15 embodiments, for example, internal sources 22 may not be used.
16 Furthermore, internal sources 22 and external sources 28 can be
17 defined by implementation, and internal sources 22 can be
18 understood herein to be sources that can be available on an
19 intranet associated with a given linkify engine 104, while
20 external sources 28 can be understood herein to include sources
21 that are not available on the intranet associated with the given
22 linkify engine 104.

23 Data from the internal 22 and external 28 sources can be
24 provided to the linkify engine 104 using one or more of a variety

1 of techniques that can be known to one of ordinary skill in the
2 art. For example, the internal 22 and/or external 28 data
3 sources can be accessed by the linkify engine 104 using standard
4 protocols or Application Program Interfaces (APIs) such as
5 Structured Query Language (SQL), Lightweight Directory Access
6 Protocol (LDAP), Hypertext Transfer Protocol (HTTP), eXtensible
7 Markup Language (XML), screen scraping, custom protocols, etc.
8 The data from the internal 22 and external 28 sources can be
9 filtered, parsed, and otherwise processed depending upon system
10 requirements. In the illustrated embodiments, the data from the
11 internal 22 and external 28 sources can be accessed or otherwise
12 made available to the linkify engine 104, to be globally shared
13 by the linkified documents 14. In some embodiments, for example,
14 internal 22 and external 28 sources can provide abstract data,
15 table of content information, index information, URLs indicating
16 locations of other documents and/or objects, or other preliminary
17 data that can be collectively referred to herein as catalog data,
18 to the linkify engine 104. Additionally and optionally, the
19 internal 22 and external 28 sources can provide more detailed, or
20 complete data, to the linkify engine 104. Furthermore, the
21 linkify engine 104 can be notified when an internal 22 or
22 external 28 source changes. Additionally and optionally, the
23 linkify engine 104 can poll the internal 22 and/or external 28
24 sources at fixed or variable intervals that can be different for

1 different sources 22, 28, to determine whether a source 22, 28
2 may have changed, and whether the linkify engine 104 information
3 from such source 22, 28 should be updated.

4 Accordingly, the methods and systems can be configured to
5 remove and/or replace links that can be present in a linkified
6 document, based on updated information and other techniques that
7 can include applications based on link integrity management.
8 Links can be removed entirely, updated with a new destination,
9 and/or replaced with a different link. In an embodiment, the
10 link removal and replacement feature can continually process
11 linkified documents 14 with the latest link information to update
12 links and direct or redirect a link to provide the most recent or
13 appropriate information. In some embodiments, links can require
14 updating, removal, and/or replacement based on changes to the
15 global and/or local configurations or other information that can
16 be updated and provided to the linkify engine 104.

17 The illustrated linkify engine 104 can utilize information
18 from a local configuration 38 and/or a global configuration 40 to
19 determine how to query or otherwise interface with the internal
20 22 and external 28 sources. The configuration files 38, 40 can
21 therefore provide data to perform the link identification and
22 establishment. Accordingly, the FIG. 3 local configuration 38
23 can be established by a system administrator or other personnel
24 familiar with the supplier's business strategy, objectives,

1 and/or structure. The local configuration 38 in such an
2 embodiment can include data based on job categories within the
3 supplier organization. Based on job category, the supplier
4 system administrator can identify and specify for the linkify
5 engine 38, those parts of the data from internal and/or external
6 data sources 22, 28 that can or should be identified and
7 linkified based on a job category or other employee description.

8 Accordingly, the linkify engine 104 can provide employees access
9 to the internal and/or external data to optimize the information
10 that can be most helpful to them, without having the linkify
11 engine 104 provide links to information, objects, or other data
12 that is not helpful. Additionally and optionally, the local
13 configuration data 38 can attach security to different job
14 categories by opting not to generate links based on job category.

15 The global configuration 40 can be similar to the local
16 configuration 38 and can be utilized in similar manners; however,
17 in the FIG. 3 system 20, the global configuration 40 can specify
18 generic configuration data that can be useful to broader categories
19 of user of the linkify engine 104 (compare to the local
20 configuration 38 that can be particularized to a given user). In
21 an embodiment, the local configuration 38 can have priority over
22 the global configuration 40. In some embodiments, the global
23 configuration 40 can be provided by a centrally located server
24 that can be in communication with the linkify engine 104, and

1 updates to the linkify engine 104 can be provided remotely. In
2 an embodiment, the global configuration can be pre-installed on
3 the linkify engine 104, and additionally and optionally, the
4 global 40 and local 38 configurations can be integrated or
5 otherwise combined in a single configuration.

6 As provided herein, the linkify engine 104 can also include
7 and/or maintain communications with one or more databases or
8 other memory devices or components to maintain information or
9 other data from the internal data sources 22, the external data
10 sources 28, the local configuration 38, and/or the global
11 configuration 40. In some embodiments, the linkify engine 104
12 can utilize cache memory. The memory can be accessed by the
13 linkify engine 104 to determine links, and such memory can thus
14 include objects and other data related to or associated with
15 objects (e.g., applications, targets, URLs of objects, and other
16 configuration data as provided herein) to which links in the
17 document 102 can be generated. Such memory can therefore be
18 referred to herein as object memory, and objects from the
19 document 102 can be linked to or otherwise associated with data
20 and/or objects in object memory. In some embodiments, object
21 memory can include pointers or other references to the internal
22 and external sources 22, 28. Accordingly, when a user activates
23 a link in the linkified document 14, data can be retrieved from

1 object memory that can then direct data transmission and/or
2 retrieval to and/or from another device or location.

3 The FIG. 3 linkify engine 104 can process requests from
4 clients 42 and servers 44. Illustrated clients can include, for
5 example, an email client 46, a web browser 48, a program that
6 displays a document that can be in a particular format including
7 Word 50 or Adobe Acrobat 52, and a telephone or other networked
8 device 54. Furthermore, servers 44 can include a wireless web
9 server 56, a web server 58, an email server 60, and a telephone
10 server 62. Those with ordinary skill in the art will recognize
11 that the methods and systems are not limited to the illustrated
12 clients and servers, and the FIG. 3 embodiment is provided merely
13 for illustration.

14 In the FIG. 3 system, requests from the clients 42 can be
15 received by the servers 44. The client-server model is well
16 known as a relationship between a requester program, otherwise
17 known as the client 42, and the program that services the
18 request, otherwise known as a server 44. It is also well-known
19 that the client 42 and server 44 can reside on the same device or
20 different devices, and such understanding can be applied to the
21 disclosed methods and systems and to FIG. 3. Accordingly, the
22 features of the linkify engine 104 can be applied to requests
23 using a variety of communications routes between the clients 42
24 and the servers 44. For example, the linkify engine 104 can

1 intercept a request from a client 42, process the request based
2 on the linkify methods and systems disclosed herein, and forward
3 the linkified request to a server 44 for processing. The
4 processed request can be returned to the client 42 via the
5 linkify engine 104, or through another communication path that
6 may not include the linkify engine 104. Additionally and
7 optionally, a request from a client 42 can be submitted to a
8 server 44, and the server 44 can thereafter transfer the
9 processed or unprocessed request to the linkify engine 104.
10 Depending upon whether the server 44 provided the linkify engine
11 104 with a processed or unprocessed request, the linkify engine
12 104 can return the linkified request to the server 44 or client
13 42. Such illustrations of the linkify engine 104 processing are
14 provided merely as examples, and not for limitation. Those with
15 ordinary skill in the art will therefore recognize that the
16 linkify engine 104 can be customized to include content and
17 satisfy a given system architecture as provided by various
18 applications or uses of the linkify engine 104. In some
19 embodiments,, the linkify engine 104 can be provided in a
20 "forwarding linking" configuration where information can be
21 "pushed" to a user by intercepting an email, linkifying the email
22 before the recipient receives the email, and providing to the
23 user a linkified email. In some embodiments, "reverse" or "back"
24 linking can be performed by presenting a document to the linkify

1 engine 104 to allow the linkify engine to return a linkified
2 document 14 by forming links from databases, object memory, etc.

3 The linkified document 14 could then be provided to others.

4 Referring now to FIG. 4, there is an architectural block
5 diagram 90 of some features of a linkify engine 104. The
6 illustrated linkify engine 104 can identify a document type or
7 format 92, divide the document into blocks 94 based on the
8 document type (e.g., text blocks for a text document, image
9 blocks for a document including images, etc.), and identify
10 modules 96 from the blocks that can or should be represented as a
11 link, based on the contents of object memory. The modules can be
12 an object as provided herein, and in some embodiments, the blocks
13 94 can be an object. Accordingly, a block 94 can include one or
14 more objects. In the FIG. 4 embodiment in which the linkified
15 document 14 includes the links (compare to other embodiments in
16 which the links can be a separate entity in the document, or
17 otherwise associated with the document), the illustrated linkify
18 engine 104 can modify the blocks to provide a link 98, and
19 reconstruct the document 100 using the modified blocks. The
20 result can be a linkified document 14. Those with ordinary skill
21 in the art will recognize that the FIG. 4 system presents only
22 one embodiment for creating linkified documents 14, and some
23 other embodiments (i.e., creating companion documents for

1 companion applications to provide an overly of links, etc.) were
2 previously discussed herein.

3 Referring now to FIG. 5, there is a block diagram 70
4 presenting more detailed features of one embodiment of a linkify
5 engine 104. As FIG. 5 illustrates, the linkify engine 104 can
6 receive a document 102 as input and can parse the document into
7 blocks based on one or more parsing techniques 72. For example,
8 the parser 72 can divide the document 102 based on document
9 format elements including HTML or XML tags, or textual elements
10 including sentences, questions, line breaks, spaces, hyphens,
11 dashes, strings of digits, strings of letters, groups of words,
12 or images, icons, etc. The parser 72 can be dependent upon the
13 type of input document 102. The linkify engine 104 can also use
14 a context filter 74 to determine which potential links are
15 appropriate based on context information or data about the
16 document 102, the user(s) who originated the document 102, the
17 viewers of the document 102 (and hence the linkified document
18 14), applications or processes in which those users may be
19 active, the requesting device, the requesting user's identity
20 (communicated from the initiating device), the user(s) location
21 (communicated from the initiating device), the user(s) time of
22 day, job function or description, security clearance,
23 configuration or profile data associated with the user, etc.,
24 with such examples provided for illustration and not limitation.

1 The illustrated linkify engine 104 can also utilize a pattern
2 matcher 76 to establish and/or refine relationships between the
3 blocks and data in object memory, using data gathered from the
4 context filter 74. In one embodiment, the pattern matcher 76 can
5 include a natural language processor. Additionally and
6 optionally, the pattern matcher 76 can process blocks, and also
7 process the original document 102 to obtain additional context
8 information. Other features of the pattern matcher 76 can
9 include linguistic, keyword proximity, and word sequence
10 analysis. Accordingly, the pattern matcher 76 can identify
11 names, locations, telephone numbers, social security numbers,
12 credit card numbers, addresses, streets, zip codes, etc.,
13 although such a list is provided for illustration and not
14 limitation. The pattern matcher 76, and other linkify engine 104
15 features, can then be integrated with, for example, local/global
16 configuration data 38, 40 to determine whether a name, for
17 example, is relevant to a particular user and henceforth, the
18 name, as an object, should be linked to other information related
19 to the name. In one embodiment, information related to the name
20 can include address (street and/or email) information, telephone
21 (home, business, mobile, etc.) information, shipping information,
22 credit card preferences, account information, customer
23 information, etc. Accordingly, the linkify engine 104 can modify
24 the text to translate the name to a link that, when activated,

1 retrieves, displays, and/or otherwise processes the related
2 information. As provided herein, the linkify engine 104 can
3 recognize or otherwise identify many other forms of information
4 and/or objects, and based on configuration data and other data
5 accessible to the linkify engine 104 through object memory,
6 generate associations between the objects in the document and
7 object memory. Accordingly, the illustrated linkify engine 104
8 can also include a targeting feature 78 that can format the
9 information for the target that will display and/or utilize the
10 retrieved and/or processed information. An illustration of some
11 targets is provided previously herein, and includes links,
12 telephone dials/servers, pop-up windows, asides, etc. Depending
13 upon how the retrieved information will be presented, the linkify
14 engine 104 can reconstruct the document 102 to include the links
15 and the appropriate presentation of the retrieved information,
16 thereby generating the linkified document 14. In the FIG. 5
17 system, these features can be performed by the presentation
18 module 80. Accordingly, the presentation module can create links
19 with features that can include anchor links, icons, call-outs,
20 footnotes, cursor hover presentation, abstract representation,
21 etc. The output of the illustrated presentation module 80, and
22 hence the illustrated linkify engine 104, can be a linkified
23 document 14 that can include visible links between objects in a
24 document 104, and other available information. In one

1 embodiment, the links can be indicated using a highlighting
2 feature, while in other embodiments, the links can be underlined,
3 bolded, shadowed, outlined, or use a combination thereof. Those
4 with ordinary skill in the art will recognize that the methods
5 and systems disclosed herein are not limited to the method of
6 displaying or identifying a link.

7 In an embodiment, linkified documents 14 can be associated
8 with a selectable option to allow links to be visible or non-
9 visible, or otherwise encoded. For example, a user-selectable
10 option could include a toggle switch or button that can be
11 incorporated into the linkified document 14, or alternately, into
12 a plug-in or other compatible application that is associated with
13 the linkified document 14. In some embodiments, the selectable
14 option can be controlled by a system administrator that can
15 control the options via a configuration file, for example,
16 depending upon job category and/or another criteria. Links can
17 be categorized or otherwise associated based on category or
18 class, and accordingly, in some embodiments, links can be viewed
19 according to category or class.

20 As indicated previously herein, the linkify engine 104
21 features presented in FIG. 5 are merely an illustration, and many
22 variations can be performed. As provided herein, the features of
23 the linkify engine can use the global and/or local configuration
24 data 38, 40 to enhance feature effectiveness. Accordingly, in

1 some embodiments, the linkify engine 104 features can be divided
2 amongst several processors, and thereafter divided into global
3 and/or local processing of such features. For example, in one
4 embodiment, one processor can provide a linkify engine 104 based
5 on local configuration data 38, while a second processor can
6 independently or dependently provide a linkify engine 104 based
7 on global configuration data 40. The data from the two linkify
8 engines can be transferred to one or two presentation modules 100
9 to construct the linkified document 104.

10 Referring now to FIG. 6, there is a sample illustration of
11 the linkify engine 104 as disclosed herein. As FIG. 6 indicates,
12 a document 102 in the form of an email can be presented to the
13 linkify engine 104, wherein links can be identified and created
14 based on the methods and systems disclosed herein, and the output
15 of the linkify engine 104 can be a linkified document in the form
16 of an email 14. As the FIG. 6 illustration indicates through
17 highlighting, two links were created based on the linkify engine
18 104: The name "John Smith", and the telephone number "123-555-
19 1212." If a user viewing the email activates (e.g., click,
20 hover, etc.) the "John Smith" link, a pop-up window 106 can
21 appear to display database information regarding John Smith.
22 Additionally, if the telephone number link is activated, using
23 configuration information, the link activation can provide a
24 connection between the user's telephone line, and the linked

1 telephone number. For example, in one embodiment, activating a
2 telephone link can cause the user's line to ring. Upon detecting
3 that the user's hand-set is picked-up, the link can cause the
4 linked number to be dialed.

5 As indicated previously herein, in some embodiments, the
6 links may not be selectable, and the linkify engine 104 can be
7 configured to generate the links and automatically activate the
8 links. For example, in one embodiment of automatic link
9 activation, a document 102 presented to the linkify engine 104
10 can produce a linkified document 14 that includes replaced text,
11 updated text, additional information, etc.

12 In an exemplary embodiment where the linkify engine 104 can
13 produce a linkified document 14 that includes replaced text
14 and/or additional information, the linkified document 14 can be
15 presented to illustrate, provide, or otherwise present a version
16 of the linkified document 14 that can include abbreviated forms
17 of the objects, including abbreviated words, terms, conditions,
18 etc. The abbreviated linkified document 14 can also include, for
19 example, a link, button, selection, or other object that can be
20 referred to as a toggle object that can reside within the
21 document that, when selected or otherwise designated, can cause
22 the abbreviated linkified document 14 to convert to an
23 unabbreviated linkified document 14. The reverse operation can
24 also be performed to convert an unabbreviated linkified document

1 14 to an abbreviated linkified document 14. In some embodiments,
2 the conversion from abbreviated to unabbreviated, and vice-versa,
3 can be performed on the entire linkified document 14, and/or can
4 be performed on an object-by-object basis. Those with ordinary
5 skill in the art will recognize that the abbreviations can be
6 provided by the local and/or global configurations 38, 40.
7 Furthermore, in some embodiments, the context filter 74, for
8 example, can determine whether the user should be presented with
9 the abbreviated linkified document 14, where such context
10 sensitive conditions could include the time of day (e.g., is the
11 user in a hurry?), the display and/or device type, and other
12 context-sensitive information, data, or criteria provided herein.

13 In an embodiment of the abbreviated linkified document 14, a
14 user or other viewer can be provided with a respective or
15 corresponding unabbreviated representation of a word, element, or
16 object by, for example, hovering the cursor over the abbreviated
17 word, element or object. In other embodiments, the unabbreviated
18 representation can be obtained or viewed by selecting the
19 abbreviated representation of the word, element, or object.

20 In an email document, abbreviations in the linkified
21 document 14 can be understood to include eliding headers,
22 forwards, and included and quoted material. In some embodiments,
23 individual e-mails and/or e-mail lists can be summarized for
24 presentation.

1 In one embodiment, the linkified document 14 can provide
2 pre-configured or derived (e.g., guessed) responses to e-mails
3 and/or Short Message Service (SMS) pages, for example, to allow
4 users with limited input capabilities (e.g., mobile devices,
5 cellular phones, PDAs, etc.) to respond . For example, if a
6 question is detected such as "Want to meet me for lunch?", the
7 linkify engine 104 may determine that the question can be
8 answered with a "Yes/No" response, and the linkified document 14
9 can include selectable options or objects to allow the user to
10 choose or otherwise select the Yes/No option. Additionally and
11 optionally, in an example, the linkified document 14 can include
12 a selectable option to cause a phone connection to be established
13 between the email or document sender, and the user or viewer of
14 the linkified document 14. The pre-configured response can thus
15 be communicated to a telephone server, email server, or other
16 device or individual upon selection of the pre-configured
17 response, and additionally and optionally, selection of a pre-
18 configured response can cause an application to execute or cause
19 any one or more of other actions or responses previously
20 described herein relative to link selection. Those with ordinary
21 skill in the art will recognize that the systems and methods
22 herein are not limited to emails or SMS pages, nor are the pre-
23 configured selectable responses or options limited to Yes/No
24 and/or telephone numbers. For example, based on context, pre-

1 configured options can include a menu of options or other
2 selectable items or objects that can be inserted into the
3 linkified document 14 to facilitate a response and/or input from
4 the user.

5 Those with ordinary skill in the art will therefore
6 recognize that from the illustrated embodiments that the
7 disclosed methods and systems can be used to linkify customer
8 order forms to financial, shipping, inventory, contact, and
9 rebate data, among other data. In another embodiment, an email
10 can be linked to a management system, contact information,
11 product and/or customer databases, etc. Such example embodiments
12 are provided for illustration of the methods and systems.
13 Accordingly, those with ordinary skill in the art will recognize
14 that there are many applications for which the disclosed methods
15 and systems can be utilized. Emails, web pages, word processing
16 documents, etc., can be linked to database records, other emails,
17 web pages, word processing documents, etc. Context sensitivity
18 and configuration features can allow dynamic, pertinent links
19 that can be generated at locally and/or at a central location.

20 What has thus been described are methods and systems to
21 create dynamic associations or links between objects. The
22 associations or links can be created by a linkify engine that
23 creates the links by processing a document. The linkify engine
24 can maintain and/or access at least one database or other memory

1 component capable of storing data from which the associations can
2 be formed. The linkify engine can also utilize configuration
3 data to assist in determining associations. Objects in the
4 document that can be linked by the linkify engine can include a
5 word, group of words, number or group of numbers, image, icon,
6 picture, or other object in a document. The document objects can
7 be associated or linked to document objects in other documents,
8 or to applications, images, icons, pictures, or other textual and
9 non-textual objects that may not be associated with a document.
10 In one embodiment, the association between objects can be
11 represented as a hypertext link. Upon link activation, data from
12 the associated objects can be retrieved and/or a process can be
13 activated.

14 The methods and systems described herein are not limited to
15 a particular hardware or software configuration, and may find
16 applicability in many computing or processing environments. The
17 methods and systems can be implemented in hardware or software,
18 or a combination of hardware and software. The methods and
19 systems can be implemented in one or more computer programs
20 executing on one or more programmable computers that include a
21 processor, a storage medium readable by the processor (including
22 volatile and non-volatile memory and/or storage elements), one or
23 more input devices, and one or more output devices.

1 The computer program(s) is preferably implemented using one
2 or more high level procedural or object-oriented programming
3 languages to communicate with a computer system; however, the
4 program(s) can be implemented in assembly or machine language, if
5 desired. The language can be compiled or interpreted.

6 The computer program(s) can be preferably stored on a
7 storage medium or device (e.g., CD-ROM, hard disk, or magnetic
8 disk) readable by a general or special purpose programmable
9 computer for configuring and operating the computer when the
10 storage medium or device is read by the computer to perform the
11 procedures described herein. The system can also be considered
12 to be implemented as a computer-readable storage medium,
13 configured with a computer program, where the storage medium so
14 configured causes a computer to operate in a specific and
15 predefined manner.

16 Although the methods and systems have been described
17 relative to a specific embodiment thereof, they are not so
18 limited. Obviously many modifications and variations may become
19 apparent in light of the above teachings.

20 Many additional changes in the details, materials, and
21 arrangement of parts, herein described and illustrated, can be
22 made by those skilled in the art. Accordingly, it will be
23 understood that the following claims are not to be limited to the
24 embodiments disclosed herein, can include practices otherwise

1 than specifically described, and are to be interpreted as broadly
2 as allowed under the law.

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